

on the gradual decreasing of the disturbance, there exists the probability that at the time of A. Ångström's measurements in California (August/September, 1913) \* there were also dust masses prevailing in the higher atmospheric strata. Considering the great theoretical importance Ångström's final results have for the understanding of the radiation of the highest atmospheric strata<sup>9</sup> and, what is of more immediate interest, for their ozone content, depending undoubtedly on the degree of sun's activity, new measurements in optically undisturbed times will be needed.

I may be allowed to point out another fact: If A. Ångström's new actinometer for sky radiation<sup>10</sup> proves useful and magnesium oxide really very well absorbs the wave lengths greater than  $4\mu$ , then the necessary means to shelter the Stevenson shelter against radiation influence would be found. Long series of observations not yet published have proved how much the shelter needs this protection in a genuine radiation climate like that of Davos, where intense radiation is combined with low air temperature. The following unpublished figures will show that in these conditions of radiation color offers but little protection to the raw material beneath it. The experiments were made in the period from October, 1913, to January, 1914 (that is to say, low sun altitude), with hollow boxes of wood of cylindrical shape 3 cm. high and 2 cm. in diameter set up in a place entirely protected against reflected radiation and wind and free on all sides. They were filled with mercury to a level where the sun's rays could not strike the surface. In this mercury the thermometer bulb was freely suspended. The boxes were painted in the following colors: White, pink, yellow, red, and black. The result obtained was as follows. The addition of a calorie of radiating heat produced the following rise of temperature:

	° C.
White.....	10.8
Pink.....	11.0
Yellow.....	14.8
Red.....	15.7
Black.....	16.9

What is remarkable in this is the fact that wood remains a great heat collector also when it is painted with best reflecting white color, and that the color does not have so great an effect as is generally believed; for the dark color only adds  $6^{\circ}$  to the  $11^{\circ}$  temperature increase which the wood undergoes under the white paint. It is therefore more important that the material of the building be well chosen than the color. When absolute calm prevails, the temperature of the air is not of great influence during this one-sided insolation, but with the air in movement loss of heat sets in through conduction, and 30 per cent of the irradiating heat (roughly speaking) is lost when the air movement is slight, and 60 per cent when the movement is of mean degree. With the more strongly absorbing dark colors this loss is noticeably slower than with the light ones. If, on the other hand, reflex radiation from light walls of the neighborhood intervene, the unchanged free exposure being continued, that is to say, the box of wood being on all sides washed by the air the heat increase of the dark colors amounts to one-third, that of the lighter ones to one-fifth. If the increase of heat radiation ceases at sunset, the temperature of the dark colors decreases quicker, according to their greater surplus over the temperature of the ambient air, especially for the first 10 minutes; after 20 minutes the temperature of the dark colors exceeds that

of the air about  $3\frac{1}{2}^{\circ}$  against  $3\frac{1}{2}^{\circ}$  for the lighter colors; after 40 minutes about  $2^{\circ}$  against  $1^{\circ}$ . The loss of heat is very slow as may be seen.

Finally, an exceedingly ingenious test for the investigations in infrared may be mentioned; that is, the use of bacteria which react very keenly at spectrum line's breadth. These can be advantageously substituted for the photographic plate more or less satisfactorily in this part of the spectrum.

#### A WATERSPOUT IN THE ADIRONDACKS.

The United States Weather Bureau meteorologist at Albany, N. Y., Mr. George T. Todd, has reported an interesting and unusual waterspout which was observed on Lake Newcomb in the Adirondack Mountains. On the afternoon of May 16, Mr. F. W. Kelly, of Albany, and several others observed a whirl of water which appeared to be a partly formed waterspout. The column of water was about 4 feet in height and about as large in diameter as a flour barrel. It moved across the lake from northwest to southeast, whirling counterclockwise. There appeared to be no unusual atmospheric disturbance on shore before the waterspout started, but, beginning where the water was about a foot deep and progressing across the lake where a depth of 3 or 4 feet, the spout ended with a considerable splash on the opposite shore. A depression in the water level near the spout was also observed. The center of the whirl passed within 20 to 25 feet of Mr. Kelly, but no unusual atmospheric condition was noticeable. He said there was a sound of rushing water similar to that made by turning the water from a high pressure fire hose on another body of water.—C. L. M.

#### TORNADO IN UNION COUNTY, N. C., JUNE 20, 1920.

At 2 p. m. of June 20 a tornado of considerable violence formed in the southwestern part of Union County, approximately 22 miles south-southeast of Charlotte, seriously injuring one person, demolishing eight dwellings and a number of barns and outbuildings, and inflicting considerable damage to cotton fields, crops, and timber. The total damage is estimated at about \$30,000.

The storm apparently began a short distance south of the village of Waxhaw and ended at or near Wesleys Chapel, having followed a northeasterly path about  $7\frac{1}{2}$  miles long and about 200 feet wide.

It is possible that the inception of this tornado was witnessed by Mr. and Mrs. Rock Morrison, who were traveling by automobile from Miami, Fla., to Charlotte. At 2 p. m. of the above date they stopped at the Osceola Creek bridge to adjust a tire, and their experiences there are reported in the Charlotte News as follows:

"While the automobile was standing, Mrs. Morrison observed a small whirlwind stirring up the leaves on the top of a small hillock about a quarter of a mile away. It dipped toward the surface of the ground for a moment and appeared to lift a few feet above the surface for a moment. This was indicated by the leaves and stubble once picked up fluttering back to earth. Presently, however, there was a noticeable quantity of leaves and stubble flying in the air, and Mrs. Morrison directed her husband's attention to it.

"In a moment the tiny whirlwind had resolved itself into a swirling tornado, which became black with leaves, sticks, twigs, and limbs of trees and debris of various kinds, as it started a rapid sweep across the landscape with an ominous roar.

"Awestruck at the unusual sight, Mr. and Mrs. Morrison watched the cloud, which was clearly funnel-shaped, sweep over the country and pick up a house which it smashed, hurling bits of the shingle roof, window sash and other bits of wood high in the air. It twisted trees into tooth brushes of colossal size, and cut a swath through the forest and over fields as distinct as if some giant with a scythe had

\* Smithsonian Miscellaneous Collection loc. cit. Hergesell, Abhandl. Aeronaut. Observ. Lindenberg, Bd. XIII, 1919.

<sup>10</sup> MONTHLY WEATHER REVIEW, 1919, 47: p. 795.